Norway’s full scale integrated CCS project

Bjørn-Erik Haugan
Gassnova
Equinor, Total and Shell ("Northern Lights")
CO₂ transport and storage in the North Sea

- Onshore terminal
- 110 km pipeline,
- One injection well
- Transport by ship
- 700 km
- Liquid (15 barg, -26°C)

Fortum Oslo Varme AS
Waste-to-energy plant

Norcem AS, Brevik
Cement plant

- Capture 400 kt/y each
- Amine technology
Northern Lights: a nucleus for further growth

Kilde: PCI-søknad fra Northern Lights (Equinor, Shell og Total)
• Waste-to-energy facility
• Capture 400,000 T CO$_2$/year (90%)
• 60% biogenic CO$_2$, a carbon negative project
• CCS from waste-to-energy can remove > 90 MT of CO$_2$/ year from existing plants in Europe
• Amine Technology (Shell Cansolv)
Norcem is part of HeidelbergCement, which has about 60 cement factories in Europe.

- Capture 400,000 T CO$_2$/year (50%)
- CO$_2$ will be captured by using excess heat from the production of cement
- Amine technology (Aker)
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<th>Drivers</th>
<th>Government</th>
<th>CCS a key govt Climate initiative</th>
<th>Pan European Project of international relevance and involvement</th>
<th>DEMO for</th>
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<td>Project building on 20ys of RD&amp;D, Sleipner, Snøhvit, Equinor</td>
<td>Gross 1-1.5bn EUR Defined project period</td>
<td>• Technology, • bsn framework • Regulation • Safety of CCS</td>
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<td>NS very large storage capacity</td>
<td>Operation 2023/24</td>
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<td>Gassnova, Climit, TCM</td>
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Northern Lights Building on core competence

Future Bsn op. Growth potential

Sponsored infrastructure with spare capacity

CO2 tariff

Drivers

Capture sites Business, technology and ops learning

Reduced CO2 footprint

Premium on Low CO2 products

Industrial project development

CAPEX and OPEX support

Cost and performance incentives

Strategic vision

Stakeholder engagement